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(54) Title: METHOD OF WASTE STABILIZATION WITH DEWATERED CHEMICALLY BONDED PHOSPHATE CERAMICS

(57) Abstract: A method of stabilizing a waste in a chemically bonded phosphate ceramic (CBPC). The method consists of preparing a slurry including the waste, water, an oxide binder, and a phosphate binder. The slurry is then allowed to cure to a solid, hydrated CBPC matrix. Next, bound water within the solid, hydrated CBPC matrix is removed. Typically, the bound water is removed by applying heat to the cured CBPC matrix. Preferably, the quantity of heat applied to the cured CBPC matrix is sufficient to drive off water bound within the hydrated CBPC matrix, but not to volatalize other non-water components of the matrix, such as metals and radioactive components. Typically, a temperature range of between 100°C-200°C will be sufficient. In another embodiment of the invention wherein the waste and water have been mixed prior to the preparation of the slurry, a select amount of water may be evaporated from the waste and water mixture prior to preparation of the slurry. Another aspect of the invention is a direct anyhydrous CBPC fabrication method wherein water is removed from the slurry by heating and mixing the slurry while allowing the slurry to cure. Additional aspects of the invention are ceramic matrix waste forms prepared by the methods disclosed above.